# *APPENDIX*

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## PRESERVATION SUPPLEMENT 72-3
## The Preservation Research Program of the Library of Congress

When the Library of Congress reorganized its preservation program in 1967, major emphasis was placed upon the establishment of a laboratory able to undertake research projects leading to solutions to the many problems which confront librarians and archivists in the preservation of their collections.

Such a laboratory became a reality in 1971 with the appointment of the staff of the Preservation Research and Testing Office. As one of the five units of the Administrative Department's Office of the Assistant Director for Preservation, the Preservation Research and Testing Office is responsible for three basic programs: pure research into the fundamental aspects of preservation problems, applied research, and testing and quality control of supplies used in the preservation of library materials.

Planning for the physical arrangement and equipping of the laboratory took place concurrently with the appointment of the staff. Basic furnishings and equipment were installed by mid-1971, and the laboratory has been operational since that date. Staff, laboratory furnishings, and operating expenses of the laboratory are funded by the regular appropriations of the Library. Equipment necessary for the initial research program was provided by a gift of $75,000 from the Council on Library Resources, Inc.

Under the direction of John C. Williams, Preservation Research Officer, in cooperation with Peter Waters, Restoration Officer, the research program was established early in 1972. Some 20 research projects have now been approved and are either underway or waiting to be initiated as staff commitments permit.

Suggestions and recommendations for research projects are accepted from the Library of Congress staff, and inasmuch as the Library's preservation research program benefits the library and archival communities generally, suggestions from outside sources are considered as well. All recommendations for research are submitted to a three-man committee for review, discussion, and eventual approval or rejection. This committee, consisting of the Assistant Director for Preservation, the Preservation Research Officer, and the Restoration Officer, considers all recommendations in the light of their potential importance and interest to the conservation problems of the library community. Projects approved by the committee are placed in one of three priority groups and assigned to an appropriate member of the research staff for investigation. Quarterly and occasionally monthly or weekly reports are submitted by each investigator for committee review.

Among the research projects now underway, those of special interest to librarians and conservators are the following:

(1) An evaluation of all presently used methods for neutralizing and alkaline buffering of paper. No comparative study of these various methods in current use has been undertaken previously. The present study is expected to identify the advantages and disadvantages of each of the several methods.

(2) An investigation into the principles of gaseous deacidification and the identification of a method or methods by which books can be treated economically and safely to decrease the rate of deterioration.

(3) An investigation of the possibility of restoring strength to paper which has already deteriorated using the technique of graft polymerization. If successful such a process could restore to usable condition thousands of volumes which are now so brittle they cannot be handled without damage.

(4) A concurrent series of investigations to identify ways of stabilizing and restoring flood damaged materials. Although this program had been approved prior to the floods caused by hurricane Agnes, the damage created at that time and similar problems raised by the recent fire in the Law Library of Temple University as well have resulted in the assignment of a higher priority to this work. A complete investigation of these problems is underway.

(5) A comprehensive analysis of stains and discolorations in paper, from the viewpoints of both identification and removal, is under study by the laboratory in cooperation with the paper conservators of the Restoration Office workshop.

(6) An investigation of the uses, types, methods of formulation, shelf life, and other properties of adhesives used in the conservation of library materials. This is an area which has needed comprehensive study for many years. The project is being undertaken in cooperation with Mr. Waters and the staff of the Restoration Office workshops in order that the adhesives studied may be evaluated in practical terms.

(7) An identification of the characteristics of various types of storage containers for microfilm. Some years ago the National Bureau of Standards undertook to determine the cause of the now famous "J" spots. Although this investigation identified the principal factors causing this condition and suggested possible remedies, there is a dearth of information on satisfactory containers for microfilm storage. The present study seeks to further the work of previous investigators in determining the safest and most effective storage boxes for microfilm.

(8) An in-depth study of substitutes for the lamination process. Widely used since its development in the 1930's, the process of laminating documents using a thin film of cellulose acetate as an adhesive and neutral or alkaline tissue to impart strength to the document after deacidification is being re-evaluated. There is evidence that this process was not without some harmful effects caused partly by the heat required for lamination and partly by the eventual deterioration of the acetate. The present investigation will seek to clarify these points and to identify substitute and more effective measures for protecting a wide variety of materials.

(9) Analysis of those conditions which contribute most significantly to the deterioration of paper and other library and archival materials including light, atmospheric contaminants, and other factors. This field although extensively studied by others lacks quantitative data.

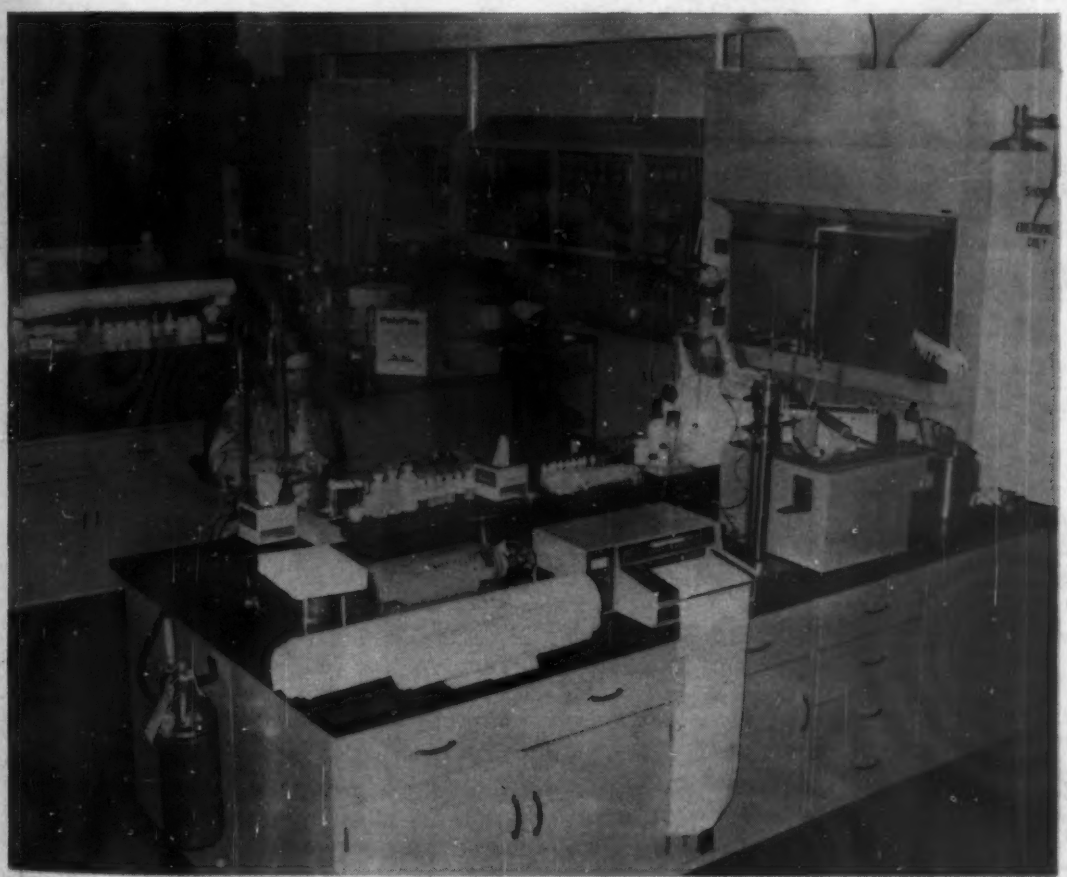
Despite increasing efforts to control airborne pollution, some forecasts indicate that such pollution will

double during the next decade. It would be useful to know, for example, the exact level of protection which must be given a document when it is deacidified in order to provide protection against present and projected pollution levels. Similarly this study is expected to yield data on the effects of various types of lighting on the longevity of library materials.

In addition to the specific programs described above, a number of smaller programs are being undertaken, many as a result of large scale projects. The evaluation of deacidification procedures, for example, has prompted a close scrutiny of methods of measuring paper permanence, such as its folding endurance or its acidity (pH). This has led, in turn, to further examination of the methods of measuring folding endurance and of expressing the results. Similarly, the laboratory has developed the concept of "alkaline reserve," which led to the presentation of a paper on this topic at the May 1972 meeting of the Paper Conservation Section of the American Group of the International Institute for Conservation.

As noted above, the Research Office is also engaged in a testing program to evaluate the quality and uniformity of materials and supplies used in the Library's preservation programs. Although this work is still expanding, data covering products tested under this program are available upon request.

Research capabilities of the laboratory, housed in Rooms 1010 and 1012 of the Library's Annex Building, have been expanded considerably with the recent installation of a large environmental testing chamber. This chamber includes specialized controls that can be adjusted to simulate a wide range of environmental conditions. Paper, book bindings, and



other preservation materials subject to variation as a result of extremes in environmental conditions can be tested under temperature and humidity conditions duplicating those found in libraries.

The laboratory has three paper-aging ovens which are also adjustable and able to produce a variety of environmental conditions. These ovens are used to age paper samples artificially; the samples are then subjected to various physical and chemical tests to determine the effects of longterm storage under specific environmental conditions.

Much of the other equipment is similar to that found in many analytical laboratories, and includes pH meters (used to measure acidity of paper), viscometers (which indicate the rate of resistance of flow of cellulose), a liquid chromatograph, and various instruments for testing the physical characteristics of paper. Included in this last category is equipment which measures paper brightness, tensile strength, thickness, folding endurance, and the resistance of a paper sample to bursting. As future projects and needs dictate, additional analytical equipment will be added.

It is believed that the preservation research work now being undertaken by the Library of Congress is one of the few such programs in the world. Of special significance is the fact that the research staff and the conservation workshop staff have an opportunity to work side by side, to exchange ideas, and to test many of the results of the research program in the practical environment of the workshop. At the same time new techniques and procedures developed in the workshop can be scientifically evaluated in the laboratory. This cross fertilization of ideas should lead to a strong, viable research program capable of developing sound solutions to the vexing preservation problems which beset librarians and archivists of the 20th century.